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ABSTRACT

The purpose of this study was to test some of the controversial issues raised by researchers studying the performances of children of middle class and low socioeconomic status (SES). In addition to studying the effects of SES and levels of intelligence on rote learning and more complex reasoning processes, the effects on reading achievement of different combinations of learning skills and environmental factors were examined. The subjects were 35 children in each of the three groups low, middle, and high SES, chosen at random from grade 1 classes in three school areas. All of the children were approximately six years in age. In a pre-grade 1 battery of psychological tests, the children had been examined for ratings in the Sprigle School Readiness Screening Test and the Stanford-Binet Test. Raven's Progressive Matrices and a word recognition list were presented when the children had been in Grade 1 for four months. To investigate more specifically the effects of intelligence and SES, four criterion groups of twelve children were selected and a 2 x 2 factorial analysis of variance was applied to the test results of the 48 children. Results indicated that rote skills and more complex reasoning processes do not seem to be differentially distributed among SES classes. It is held, however, that SES undoubtedly is a highly significant factor where scholastic achievement is concerned. (RJ)

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A STUDY OF INTELLECTUAL AND SOCIOECONOMIC FACTORS RELATED TO ROTE LEARNING REASONING AND ACADEMIC ACHIEVEMENT *

The purpose of this study was to test some of the controversial issues which have been raised by workers studying differential performances of children of middleclass and low socioeconomic status (SES).

Jensen (1969) states that it is a common observation that in some ways low SES children with low I.Q.'s appear brighter than middle class children of the same I.Q. He has asked if this is because standard I.Q. tests are culturally biased so as not to give a true picture of the disadvantaged child's intellectual ability. In other words there may be better potential in the low SES, low I.Q. child which has been suppressed by deprivation in the environment. They may show this on tasks where the verbal component is less important. He found low I.Q., low SES children showing abilities on learning tests that were unexpected in view of their apparent intellectual levels, while upper class children of the same I.Q. range performed in a way that was consistent with their low rating.

There is also some contention that children of low SES may perform well on rote memory or serializing tasks while they have more difficulty with tests requiring complex reasoning processes. Jensen suggests that "the digit span paradigm may be the purest measure of a learning ability factor". He expects this factor, which he calls Level I, to be distributed evenly amongst all classes. The ability to do such tests as Progressive Matrices which require covert mediation and abstract thinking (a Level II factor), he expects to find more frequently in higher SES children. Level I abilities are inferred to be less affected by environmental deprivation, therefore the low SES children should do as well as

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the middleclass children on rote learning and serializing tasks. Jensen assumes a continuum of "mental" ability with simple rote learning at one end, and the more complex abstract skills at the other. As the complexity of levels of reasoning increases, it is assumed that the negative effects of social disadvantage are enhanced.

In addition to studying the effects of SES and intelligence levels on rote learning and more complex reasoning processes, it was of particular interest to examine the effects on reading achievement of differing combinations of learning skills and environmental factors.

Subjects:

The subjects were thirty-five children of low SES, thirty-five of middle class, and thirty-five of high SES as determined by their neighborhood and father's occupations (Blishen, 1965). The children were chosen at random from Grade I classrooms in three school areas. All were of appropriate chronological age for the first grade (approximately six years), and there were no repeaters in the group. All the children had been administered a battery of psychological tests while in their Kindergarten year, and were to be followed as they proceeded through the primary grades.

Procedure:

1) In the pre-Grade I battery, the children had been examined by means of a specially prepared tape on an auditory test which included memory for series of digits and for sentences. Ratings on the Sprigle School Readiness Screening Test (SSRST, 1965) and the Stanford-Binet Intelligence Scale (1960) had been secured at approximately the same time. Raven's Progressive Matrices (1965) and

a word recognition list from the pre-primer in use in the schools, were presented when the children had been in Grade I for four months. The scores reported are (1) the number of words recognized by the child without the aid of pictures or other context clues, (2) the raw scores on Progressive Matrices and (3) the Matrices Quotient which takes into account the age of the child and may therefore be more directly comparable to the I.Q. rating.

2) In order to investigate more specifically the effects of intelligence and SES, four criterion groups of twelve children each were defined by their standing on each variable. A 2 x 2 factorial analysis of variance was applied to the test results of the forty-eight children.

Results:

1) Where the total group comparison is made (Table I), significant differences are found in the scoring between low and upper class children in all cases. The differences between middle and upper class scores are not significant except where reading achievement is concerned. The differences between low and middle SES scores are significant except in the case of the Sprigle Reading Test. This latter result is due to the younger age at which many of the middle class children did the test. There is no evidence here that low SES children are unduly penalized by the standard intelligence test, for their performance follows I.Q. lines even in the completely nonverbal Progressive Matrices Test. Table I shows that while mean scores tend to improve in the direction of economic status, there is within each group on each variable, a wide range of scoring, with considerable overlap.

2) In the case of the four criterion groups, both the Progressive Matrices scores show no significant effects of either SES or I.Q. Rote memory

scores are significantly affected by I.Q. levels but not by SES. School Readiness (Sprigle) scores are also very significantly related to I.Q. rather than to SES.

Word recognition scores are highly influenced by both I.Q. and SES, but owing to a very large "within group" variance, the interaction of the two factors with school achievement fails to reach significance. Table II shows the overall scoring for the four groups. I.Q.'s were arbitrarily matched to obtain significant differences. Otherwise there is a tendency for scores to decrease toward the low I.Q., low SES end of the continuum.

There is no evidence that simple and complex skills are differentially distributed at socioeconomic levels. Thirteen high SES children tended to show better performance on Progressive Matrices Quotients (P.M. Age/C.A.) than on the intelligence scale while fourteen low SES children moved in the same direction. The ability to do the abstract reasoning required by the Matrices was not affected either by I.Q. or SES in the matched groups.

The best reading scores were found among the children in both socioeconomic levels who were high in both rote and complex skills. For the low SE group of mixed I.Q., only a deficiency in both rote memory and reasoning significantly lowered the level of achievement below the average for the school.

Table II shows clearly that low SES, low I.Q. children do not appear brighter than their middleclass counterparts on tests other than I.Q. Though mainly the differences are not significant, it seems that, except for the Sprigle scores, they tend to be slightly below the higher SES children of similar I.Q. Their word recognition scores are significantly lower. Thus Jensen's findings are

not supported in this regard among others.

Discussion:

Rote skills and more complex reasoning processes do not seem to be differentially distributed among socioeconomic classes. These children do not show different correlations of I.Q. with various tests at high and low levels of intelligence and at high and low levels of SES as contended by Jensen but questioned by Humphreys and Dachler (1969).

There is no doubt, however, that SES is a highly significant factor where scholastic achievement is concerned. The high SES children of low I.Q. make reading scores which are closely comparable to those of the low SES, high I.Q. children (Table II). Other factors not measurable by any of these tests are involved here. They are not in this case attributable to conditions in the schools which have been suggested by Schwarz and Shores (1969) as e.g., poorly lit, crowded classrooms with underpaid, poorly trained teachers. As Deutsch (1968) contends, this outcome may be related to early environmental expectations and motivations or additional aid in the home (John 1963).

Table I has shown a significant difference between the reading achievements of middle and upper class children while the level of I.Q. is statistically the same. We have shown in a previous study that the parents in the middle class group as a whole desired successful school performance but were not inclined to put undue pressure on the children to achieve. We know that the high SES are subjected to pressure at both home and school. We have not as yet studied parental expectations in the lower class group, nor has the comparative physiological and neurological status of the children of each group been completed.

It can be said that while a larger proportion of low I.Q. children are found in the low SE area, such results cannot be attributed solely to the type of test given nor to the socioeconomic conditions which may have limited the development of potential. Genetic differences must be involved here as demonstrated in the wide range of I.Q. within the same area, viz., 65 to 127. It can also be shown that I.Q. range is as useful a predictor of school success at low SE levels as at higher levels. Levels of achievement differ greatly among the SE areas due to other factors about which we can only surmise at present.

Implications:

It will be of interest to follow these children as they proceed through the primary grades to see if the gap in scholastic achievement and I.Q. between socioeconomic classes does indeed widen with the years, as cross-sectional studies have contended (Deutsch 1965). Scholastic achievement in other areas than reading must be examined. Greater competency may be shown by the low SES children in e.g., mathematics.

Growth functions of rote learning abilities and the more complex skills would be interesting to check.

With a more specific knowledge of the developmental processes and of the influences of environmental factors on them, it should be possible to apply methods of stimulation and teaching that are appropriate to basic learning capabilities (hopefully) so as to overcome the effects of unfavorable environments on the progress of the children.

The numbers in this study are too small to permit generalizations of the results. The entire group of research children in the various areas should be involved and other tests applied.

TABLE I

MEAN AND RANGE OF SCORES OF INTELLIGENCE AND LEARNING TASKS FOR CHILDREN IN DIFFERING SOCIOECONOMIC AREAS.

VARIABLES	LOW SES N=35	MIDDLE CLASS SES N=35	UPPER M-C SES N=35
S-B I.Q.	97.03 65-127	112.06 68-136	118.14 92-142
PM.Q. $\frac{\text{Mat. Age}}{\text{C.A.}}$	99.49 56-156	115.00 65-154	114.71 73-156
Raw Scores (Mat.)	15.49 10-24	18.03 12-25	17.51 10-26
Memory for Words and Sentences	6.69 2-10	7.94 4-12	8.46 5-12
Sprigle School Readiness	17.38 7-27	20.71 8-30	24.81 17-32
Word Recognition	7.09 0-25	16.11 0-42	29.28 3-78

TABLE II

MEAN AND RANGE OF SCORES OF FOUR CRITERION GROUPS ON INTELLIGENCE, LEARNING TASKS AND A SCHOOL READINESS TEST

Variables	High I.Q. Range 102 - 127 (24)		Low I.Q. Range 68 - 97 (24)	
	HI SES (12)	LOW SES (12)	HI SES (12)	LOW SES (12)
S-B I.Q.	111.42 103-123	111.42 102-127	90.58 68-97	90.17 77-97
Matrices Quotient	109.75 58-148	110.33 61-156	101.50 65-135	89.92 56-126
Matrices Raw Scores	17.25 11-23	16.75 11-24	16.08 12-22	14.50 10-20
Memory	8.58 6-12	7.67 5-10	6.58 4-11	6.08 4-7
Sprigle School Readiness Screening Test	22.25 13-29	21.67 13-27	13.08 8-18	14.33 10-18
Reading	25.17 0-60	11.67 3-25	10.75 0-29	5.33 0-17

REFERENCES

1. Blishen, B. R. The construction and use of an occupational class scale. In B. R. Blishen, S. E. Jones, K. D. Neagele and J. Porter (Eds.), Canadian Society: Sociological Perspectives. Toronto: Macmillan, 1965. Pp. 449-458.

2. Deutsch, M. The role of social class in language development and cognition. American Journal of Orthopsychiatry, 1965, 35, 78-88.

3. Humphreys, L. G. and Dachler, H. P. Jensen's theory of intelligence. Journal of Educational Psychology, 1969, 6(60), 419-426.

4. Jensen, A. R. Intelligence, learning ability and socioeconomic status. Journal of Special Education, 1969, 3(1), 23-35.

5. John, V. P. The intellectual development of slum children: some preliminary findings. American Journal of Orthopsychiatry, 1963, 33(5), 813-822.

6. Raven, J. C. The Coloured Progressive Matrices. London: H. K. Lewis & Co., Ltd., 1965.

7. Schwarz, R. H. and Shores, R. E. The academic achievement of EMR students and social class. American Journal of Mental Deficiency, 1969, 3(74), 338-350.

8. Sprigle, H. A. Sprigle School Readiness Screening Test. The Psychological Clinic and Research Center, 1965.

9. Terman, L. M. and Merrill, Maude A. Stanford-Binet Intelligence Scale. Boston: Houghton Mifflin Co., 1960.

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